

# ***BIOTIC COMMUNITIES***

## Stream Fish Distribution and Abundance

Historical records of fish collections within the Jacks Fork Watershed date back to 26 June, 1941 (MoRAP 2000). Fish collection sites are presented in Figure Bc01. From 1941 to 1997, 67 fish species (not including hybrids or larval lamprey) in 16 families have been collected within the watershed (Table Bc01)(MDC Ozark Regional Fish Collection Files; Pflieger 1989; Pflieger 1997; MDC 1999c; MoRAP 2000a).

Table Bc02 shows fish species distribution by modified 14 digit hydrologic unit. While this information provides insight into areas of the watershed where species have been collected in the past, it is important to note that the number of fish sampling sites as well as collections vary greatly between drainage units (no data is available for some units), thus negating the use of this data for any quantitative analysis.

Prior to 1981, a total of 66 fish species (not including hybrids) in 15 families were collected (including observations) within the watershed (MDC Ozark Regional Fish Collection Files; Pflieger 1989; Pflieger 1997; MDC 1999c; MoRAP 2000a). From 1981 to 1997, a total of 50 species in 16 families have been collected.

Seventeen species of fish which were observed prior to 1981 were not observed after 1980. Nearly all of these were only observed in one or two collections previously with many having not been collected prior to 1961. In addition, not all sites which had harbored these species previously were sampled after 1980 (Table Bc03). The most notable exceptions to this are the gilt darter and the American brook lamprey. Both species were collected at two separate sites from 1941-1960 and 1961-1980. These sites were again sampled after 1980 with no observations of these species. While the gilt darter appears to have never been widespread within the Jacks Fork Watershed, it has been collected at several sites within the rest of the Current River Basin (Pflieger 1997). The American brook lamprey is not common within the Missouri Ozarks. Pflieger (1997) states that "most distribution records are based on specimens collected more than 20 years ago". Despite both species having been collected at a minimal number of sites within the watershed, their absence in post 1980 collections emphasizes the need for additional attempts to detect their presence with particular emphasis given to those historical sites where these species were previously collected.

The southern cavefish is the only species collected within the Jacks Fork Watershed since 1981 which had not been collected in the watershed previously. This species was collected at a single site in 1992.

The fish fauna of the Jacks Fork Watershed is dominated by species which are characteristic species of the Ozark faunal region based on the faunal region classification of species as developed by Pflieger (1989) (Table Bc01). Thirty seven (56%) species are characteristic Ozark species, 6 (9%) are Ozark-Prairie, 6 (9%) Ozark-lowland, 3 (4%) Ozark-Big River, 1 (1%) Ozark-Prairie-Lowland, (1)1% Prairie, 2 (3%) Big River, 1 (1%) Lowland, and 8 (12%) widely distributed. In addition to these species 2 species (2%) are introduced or non-native species. These are the carp and goldfish.

## Sport Fish

The tributaries of the Jacks Fork Watershed offer a variety of angling opportunities. A total of 5 species of sport fish (as defined as game fish in MDC 1999d) are known to occur within the watershed (MDC

Ozark Regional Fish Collection Files; Pflieger 1997; MDC 1999c; MoRAP 2000a). These include chain pickerel, shadow bass, smallmouth bass, largemouth bass, and warmouth. Other game fish species including walleye, spotted bass, and paddlefish have been observed in the watershed in the past. However, these are not considered to be significant fisheries if these species are even currently present at all. The last collections of these species occurred prior to 1981.

The Jacks Fork River from Highway 17 to Highway 106 is currently (2000) managed under smallmouth bass special management regulations as part of a smallmouth bass research project currently being conducted by the Missouri Department of Conservation (MDC 1999b). This includes an 18 inch minimum length limit on smallmouth bass and a daily limit of 6 black bass which may include only 1 smallmouth bass (please refer to current copy of the Missouri Wildlife Code for the most updated regulations). As stated previously, this is part of a study implemented to "evaluate and recommend strategies for managing high-quality smallmouth bass fisheries in streams" (MDC 1999b). The remainder of streams within the Jacks Fork Watershed are currently (2000) under statewide regulations. As part of the aforementioned study, an angler survey has been ongoing since 1990 on the Jacks Fork River in order to determine the effect of the special smallmouth regulation on angling success for smallmouth bass and shadow bass, angler acceptance of the regulation, and economic value of the fishery (MDC 1999b). The survey has been split between two different time periods designated as Segment I (pre-regulation 1990-1994) and Segment II (post-regulation 1995-1998) and includes both the smallmouth bass special management area (treatment area 24.3 miles) as well as 13.1 miles of the Jacks Fork under statewide regulations (non-treatment area). Initially, these surveys were daytime surveys conducted throughout the year. However, due to low fishing pressure during the winter months, the survey period was shortened, beginning in 1992, to include only the period of April through October of each year. This survey was originally scheduled to conclude in 2000 but has been extended through 2001 (Kruse, personal communication).

Preliminary analysis of the creel data shows an overall decline in catch of both smallmouth and shadow bass as well as angler use between the the pre-regulation and post-regulation periods for both the treatment and non-treatment areas (Table Bc04). Combined catch of smallmouth and shadow bass in the treatment area averaged 12,749 and 2,334 in the pre-regulation and post-regulation periods respectively. Combined catch of smallmouth and shadow bass in the non-treatment area averaged 1,747 and 1,028 in the pre-regulation and post-regulation periods respectively. Not surprisingly, estimated catch of both smallmouth and shadow bass appear to correspond to trends in angler use (Table Bc04). Angler use in the treatment area averaged 4,394 trips (9840 hours) and 976 trips (2722 hours) in the pre-regulation and post-regulation periods respectively. Angler use in the non-treatment area averaged 2,653 trips (3032 hours) and 1,142 trips (2107 hours) in the pre-regulation and post-regulation periods respectively. As stated previously, this project is currently ongoing and thus results are preliminary. Additional data collection and analysis are yet to be done.

### Fish Stocking

Currently there are no state or federal stream stocking efforts occurring within the Jacks Fork Watershed. It appears that little comprehensive data is available regarding historical fish stocking within the watershed. Ozark Regional Office stocking records indicate that no fish stocking in streams has occurred at least since 1985. The presence of the goldfish and common carp, both introduced species, within fish community collections from the watershed prior to 1981 would indicate that these species had been stocked by some entity. The presence of goldfish could have been the result of a release from home

aquaria, private pond, etc. In regards to common carp, Pflieger (1997) notes that in the late 1800s, "the Missouri Fish Commission reared more than 80,000 for stocking in public and private waters throughout the state. It is important to note that neither goldfish nor common carp have been detected within fish community samples in the watershed since 1980. It is assumed that if any historical stocking efforts had occurred which had significant impacts on the fish community of the watershed, other than those already mentioned, this impact would have been detected within the fish community collections. Undoubtedly farm ponds within the watershed have been stocked with largemouth bass, bluegill, and channel catfish by private individuals who obtained fish from the MDC, commercial dealers, and/or other water bodies. It can be assumed that many pond owners have also probably stocked grass carp. The potential of these fish being washed into streams exists in all major precipitation events.

A lack of historical records, plus the occurrence of undocumented introductions makes it difficult to determine, with any reliability, all species which may have been introduced into the watershed. Effects of introductions vary. While the introduction of species already present in the watershed may have minimal to no effect, the introduction of non-native species can often times have disastrous consequences

### Mussels

A total of 19 species of mussels are known to occur within the Jacks Fork Watershed (Table Bc05)(MoRAP 2000b). Of these, 3 species are former Federal category-2 candidates (see table for more information) (MDC 1999e). These are the elktoe (Alsmidonta marginata), Ouachita kidneyshell (Ptychobranhus occidentalis), and purple lilliput (Toxolasma lividus). Figure Bc02 displays mussel sampling sites within the watershed. Mussel species included currently listed as "Species of Conservation Concern" include the Arkansas brokenray (Lampsilis reeveiana reeveiana) in addition to the three previously mentioned species.

### Snails

Two species of snails have been identified within the Jacks Fork Watershed (Wu et al. 1997). These are the pyramid elimia (Elimia potosiensis) and Goodrich's physa (Physa goodrichi).

### Crayfish

Five species of crayfish are known to occur within the Jacks Fork Watershed. These include the Ozark crayfish (Orconectes ozarkae), golden crayfish (Orconectes luteus), spothanded crayfish (Orconectes punctimanus), Hubbs' crayfish (Cambarus hubbsi), and the Salem cave crayfish (Cambarus hubrichti) (Pflieger 1996, MDC 1999c, and MoRAP 2000c). Four species have distributions in or closely associated with the Ozark Region (Pflieger 1996). The Ozark crayfish is found only in the White and Black River Basins in Missouri and Arkansas. The spothanded crayfish is found in the eastern half of the Ozarks in Missouri and adjacent counties in Arkansas. This species is also found in Callaway, Montgomery, and Warren Counties north of the Missouri River. The Hubbs' crayfish is limited to the principal south flowing drainages in the Ozarks from the James River Watershed in the West to the St. Francis Watershed in the East. The exception to this is the North Fork Watershed in which the Hubbs' crayfish is not found. The Salem cave crayfish, currently listed as a Missouri "Species of Conservation Concern", has been found only in Missouri and is believed to occur throughout the Eastern Ozarks from Camden to Crawford Counties, southward to Howell, Oregon, and Ripley Counties (Pflieger 1996). As its name suggests, it is a subterranean species which has been observed in a variety of subterranean habitats such as cave streams over various substrates, subterranean lakes, as well as the outlets of large springs near the

limit of daylight (Pflieger 1996). It has also, on occasion, been observed in more terrestrial areas such as the outflow of a small spring, the pool at the bottom of a deep sinkhole, and the ruts left by a truck in a fen. Figure Bc03 displays crayfish collection sites within the Jacks Fork Watershed.

Since 1991, a long-term research project focusing on crayfish has been ongoing on the Jacks Fork River (DiStefano 2000). The purpose of the project is to "develop management strategies for producing optimum numbers and sizes of crayfish to support optimum production of selected sport fishes in Missouri Ozark streams". This study has been integrated with the aforementioned smallmouth bass study in order to gain further understanding of the predator/prey relationship of smallmouth bass and crayfish. The study consists of four parts or "jobs": Job 1-literature and data review, Job 2-evaluation of sampling methods, job 3-determination of crayfish population characteristics, job 4-determination of the effects of Fishing/Harvest Regulations. Final reports for Jobs 1 and 2 have been completed. The Job 3 report is tentatively scheduled to be written in spring 2001, while the completion of the Job 4 report is to be written at a later time. Information regarding the availability of these final reports may be obtained by contacting the Missouri Department of Conservation, Fish and Wildlife Research Center, 1110 South College Avenue, Columbia, Missouri 65201.

### Benthic Invertebrates

Two hundred taxa of aquatic invertebrates have been collected within the Jacks Fork Watershed since 1961 (MDC 1998d) (Table Bc06). From 1961-1974, 112 taxa were collected within the watershed. Since 1974, 165 taxa of aquatic invertebrates have been collected. Figure Bc04 displays benthic invertebrate collection sites within the Jacks Fork Watershed.

### Species of Conservation Concern

Within the Jacks Fork Watershed, 51 species of conservation concern have been identified (Table Bc07) (MDC Ozark Regional Fish Collection Files, Pflieger 1996, MDC 1998c, MDC 1999c, MDC1999d, MoRAP 2000a, MoRAP 2000b). These include 32 species of plants (flowering plants, ferns, fern allies, and mosses); 2 species of insects; 1 species of crayfish; 4 species of mussels; 5 species of fish; 2 species of amphibian, 3 species of birds; and 2 species of mammals. One species, the gray bat, has both federal and state endangered species status. In addition, the Bachman's sparrow is a state endangered species as well as a former federal candidate for listing.

The following is a brief description of aquatic oriented animal species of conservation concern within the Jacks Fork Watershed:

### **Fish**

#### American Brook Lamprey

According to the best available data, the American Brook Lamprey has only been collected twice within the Jacks Fork Watershed (MDC Ozark Regional Fish Collection Files, MoRAP 2000a). The first collection occurred in 1941 in a single reach. The second collection occurred in 1966 in a separate reach.

#### Ozark Shiner

Since 1941 the Ozark Shiner has been collected in seven reaches within the Jacks Fork Watershed (MDC Ozark Regional Fish Collection Files, MoRAP 2000a). The latest collection of the Ozark Shiner was in 1997 at which time the species was collected in two reaches. The Ozark Shiner appears to be well

distributed within the watershed; having been collected in 5 of the 9 drainage units since 1941 and also 5 of the 9 units since 1981.

### Checkered Madtom

The best available data indicates that the first collection of the checkered madtom within the Jacks Fork Watershed occurred in 1966 at a single site (MDC Ozark Regional Fish Collection Files, MoRAP 2000a). The same site yielded this species again in 1994. In 1997, the checkered madtom was collected at three additional sites.

### Paddlefish

According to the best available data, the only collection of paddlefish within the Jacks Fork Watershed was from a single site in 1966 (MDC Ozark Regional Fish Collection Files, MoRAP 2000a).

### Southern Cavefish

According to the best available data, the Southern cavefish has only been collected from a single site within the Jacks Fork Watershed. This occurred in 1992. Because the southern cavefish does not generally occur in habitats which are typically represented in fish community collections, additional efforts may be required in order to further document this species distribution within the Jacks Fork Watershed.

## **Amphibians**

### Four-Toed Salamander

According to Johnson (1992), the four-toed salamander "is found in mosses along heavily forested, spring-fed creeks associated with igneous (Precambrian) rock, and also in and near natural sinkhole ponds". The Natural heritage database (MDC 1999c) indicates the last observation of the four-toed salamander within the Jacks Fork Watershed occurred in 1980.

Ozark Hellbender -The Ozark Hellbender is restricted to the North Fork Watershed and to rivers and streams of the Black River System (Johnson 1992). According to the Natural Heritage Database, the last recorded observation of the Ozark Hellbender in the watershed was 1992 (MDC 1999c).

## **Mussels**

### Elktoe

The elktoe has been collected at two sites within the Jacks Fork Watershed. It was last collected in the watershed in 1973 (MoRAP 2000b).

### Arkansas brokenray

The Arkansas Brokenray has been collected at 9 sites within the Jacks Fork Watershed (MoRAP 2000b). This species is relatively widespread within the watershed; being found in 6 of the 9 drainage units. It was last collected in the watershed in 1982.

### Ouachita kidneyshell

The Ouachita kidneyshell has been collected at 9 sites within the Jacks Fork Watershed (MoRAP 2000b). This species is relatively widespread within the watershed; having been collected in 5 of the 9 drainage units. This species was last collected in the watershed in 1982.

### Purple lilliput

The purple lilliput has only been collected at a single site within the Jacks Fork Watershed. This collection occurred in 1973 (MoRAP 2000b).

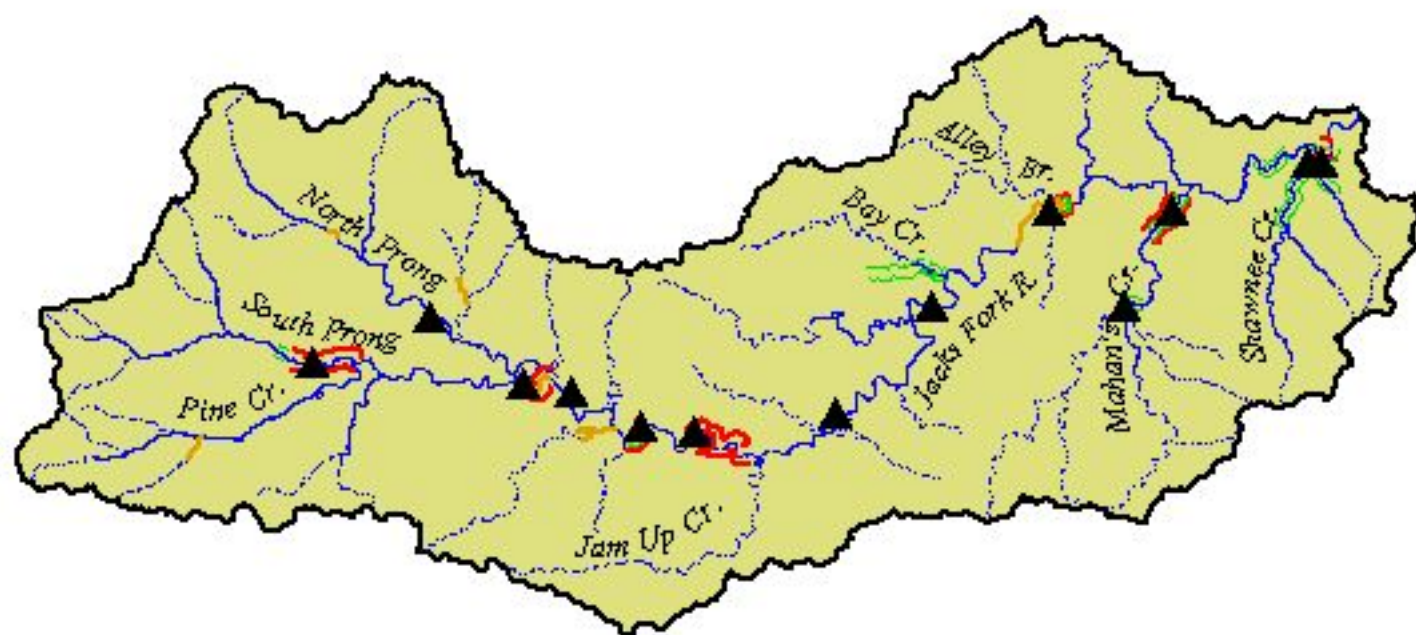
## **Crayfish**

### Salem Cave Crayfish

Pflieger (1996) indicates that the Salem Cave Crayfish has been collected at a single site within the Jacks Fork Watershed (no date given). As is the case with the southern cavefish, the Salem Cave Crayfish generally does not inhabit areas typically included in crayfish or benthic invertebrate samples. Additional sampling focused on subterranean habitats may be necessary in order to further document the distribution of this species within the watershed.

Figure Bc01.

## Jacks Fork Watershed Fish Community Samples



4 0 4 Miles

### Fish Collections

- ▲ Watershed Inventory and Assessment  
1997 Collection Site.

#### Missouri Aquatic Gap Project (MoRAP 2000)\*

- 1981-2000
- 1961-1980
- 1941-1960

\*Includes Missouri Department of Conservation and  
National Park Service collections.



Figure Bc02.

## Jacks Fork Watershed Mussel Community Samples

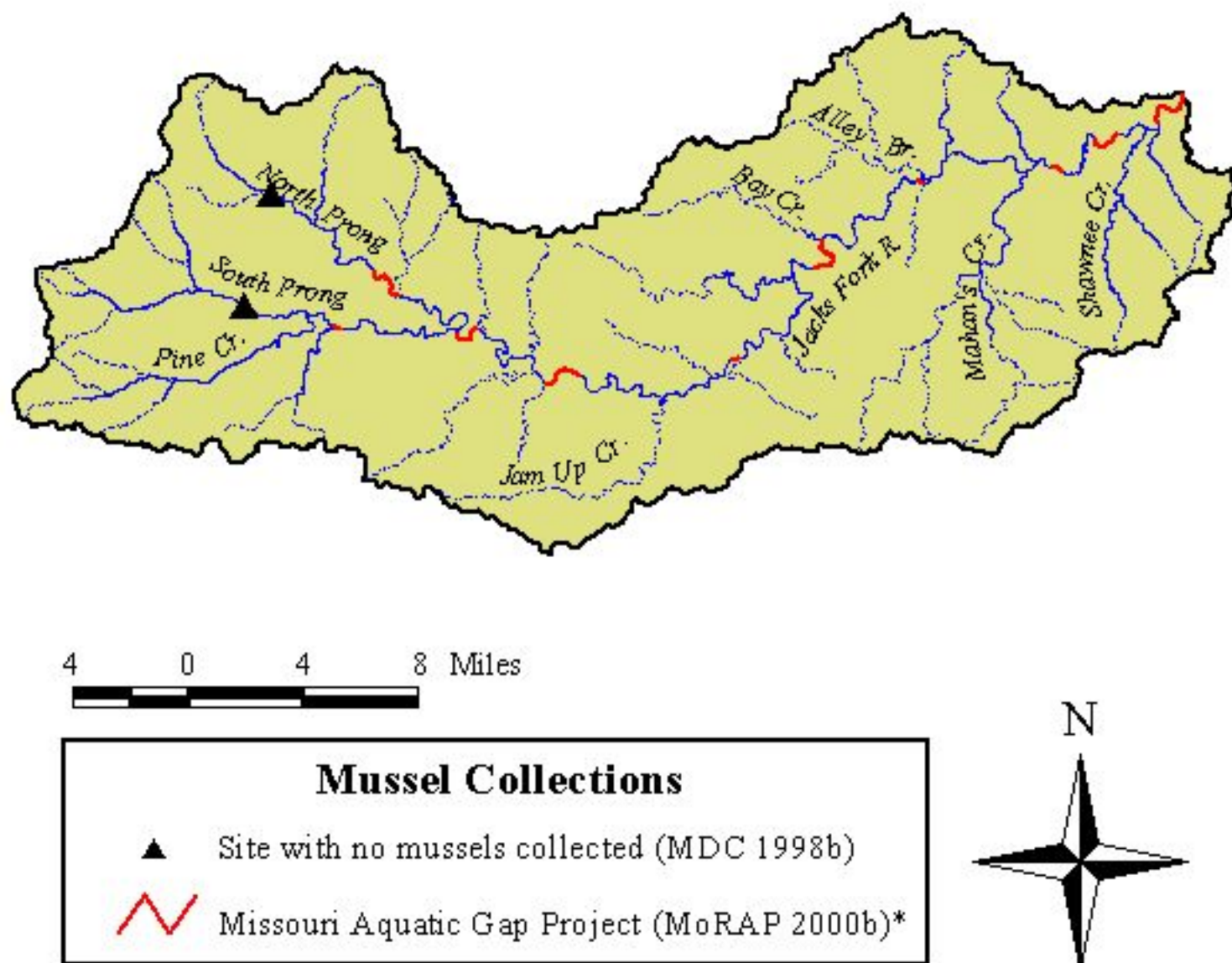


Figure B c03.

# Jacks Fork Watershed

## Crayfish Community Samples

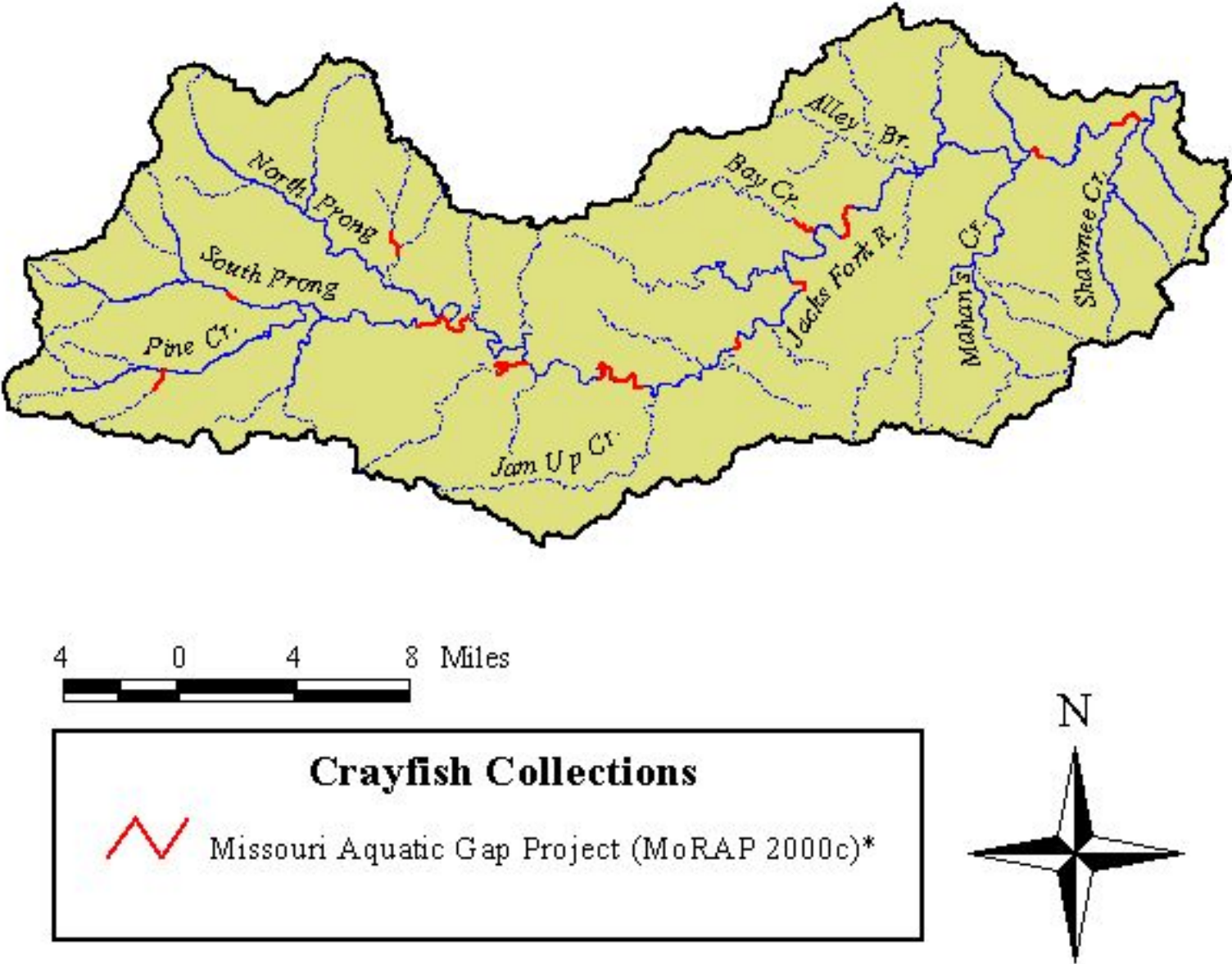


Figure Bc04.

# Jacks Fork Watershed

## Benthic Invertebrate Community Samples

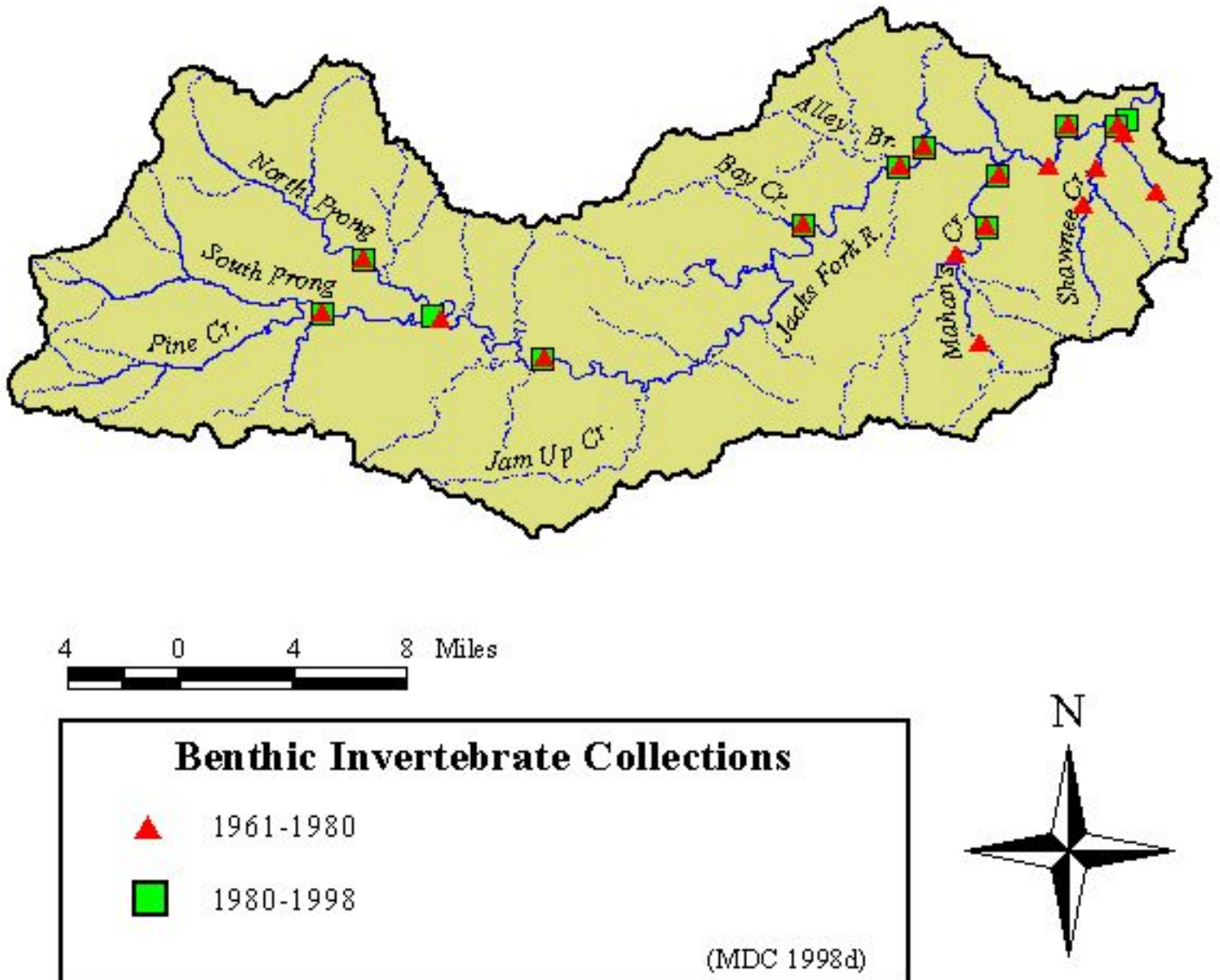


Table Bc01. Fish species with a distribution range of the Jacks Fork Watershed (MDC Ozark (1 of 3) Regional Fish Collection Files; Pflieger 1989; Pflieger 1997; MDC 1999c; MoRAP 2000a).

<i>Scientific Name</i>	<i>Common Name</i>	<b>Geographic Affinity</b>	<i>Sample Date</i>
	larval lamprey	<i>O</i>	
<i>Ambloplites ariommus</i>	shadow bass	<i>O</i>	1-2-3
<i>Ameiurus melas</i>	black bullhead	<i>P</i>	2
<i>Ameiurus natalis</i>	yellow bullhead	<i>O,P</i>	2-3
<i>Anguilla rostrata</i>	American eel	<i>O,R</i>	2
<i>Aplodinotus grunniens</i>	freshwater drum	WIDE	2
<i>Campostoma anomalum</i>	central stoneroller	<i>O,P</i>	1-2-3
<i>Campostoma oligolepis</i>	largescale stoneroller	<i>O</i>	1-2-3
<i>Carassius auratus</i>	goldfish	<i>I</i>	2
<i>Catostomus commersoni</i>	white sucker	<i>O,P</i>	2
<i>Chaenobryttus gulosus</i>	warmouth	<i>L</i>	2-3
<i>Cottus carolinae</i>	banded sculpin	<i>O</i>	1-2-3
<i>Cottus hypselurus</i>	Ozark sculpin	<i>O</i>	1-2-3
<i>Cyprinella galactura</i>	whitetail shiner	<i>O</i>	1-2-3
<i>Cyprinus carpio</i>	common carp	<i>I</i>	2
<i>Dorosoma cepedianum</i>	gizzard shad	WIDE	2
<i>Erimystax harrisi</i>	Ozark chub	<i>O</i>	1-2-3
<i>Erimyzon oblongus</i>	creek chubsucker	<i>O</i>	1-2-3
<i>Esox niger</i>	chain pickerel	<i>O</i>	2-3
<i>Etheostoma blennioides</i>	greenside darter	<i>O</i>	1-2-3
<i>Etheostoma caeruleum</i>	rainbow darter	<i>O</i>	1-2-3
<i>Etheostoma euzonum</i>	Arkansas saddled darter	<i>O</i>	2-3

**Sample Date:** 1 = collected 1941 to 1960; 2 = collected 1961 to 1980; 3 = collected 1981 to 1997

**Geographic Affinity:** L=Lowland, O=Ozark, P=Prairie, R=Big River, Wide=Widely Distributed,

I=Introduced

Table Bc01. Fish species with a distribution range of the Jacks Fork Watershed (MDC Ozark (2 of 3) Regional Fish Collection Files; Pflieger 1989; Pflieger 1997; MDC 1999c; MoRAP 2000a).

Scientific Name	Common Name	Geographic Affinity	Sample Date
<i>Etheostoma flabellare</i>	fantail darter	O	2-3
<i>Etheostoma uniporum</i>	current darter	O,P	1-2-3
<i>Etheostoma zonale</i>	banded darter	O	1-2-3
<i>Fundulus catenatus</i>	northern studfish	O	1-2-3
<i>Fundulus olivaceus</i>	blackspotted topminnow	L,O	1-2-3
<i>Hypentelium nigricans</i>	northern hog sucker	O	1-2-3
<i>Ichthyomyzon castaneus</i>	chestnut lamprey	O,R	2
<i>Ictiobus cyprinellus</i>	bigmouth buffalo	R	2
<i>Labidesthes sicculus</i>	brook silverside	O	1-3
<i>Lampetra aepyptera</i>	least brook lamprey	O	2
<i>Lampetra appendix</i>	American brook lamprey	O	1-2
<i>Lepisosteus osseus</i>	longnose gar	WIDE	2-3
<i>Lepomis cyanellus</i>	green sunfish	WIDE	1-2-3
<i>Lepomis macrochirus</i>	bluegill	WIDE	1-2-3
<i>Lepomis megalotis</i>	longear sunfish	L,O	1-2-3
<i>Lepomis miniatus</i>	redspotted sunfish	L,O	1-2-3
<i>Luxilus chrysocephalus</i>	striped shiner	O	1-2-3
<i>Luxilus zonatus</i>	bleeding shiner	O	1-2-3
<i>Lythrurus umbratilis</i>	redfin shiner	O,P,L	2-3

<i>Micropterus dolomieu</i>	smallmouth bass	O	1-2-3
<i>Micropterus punctulatus</i>	spotted bass	O,L	2
<i>Micropterus salmoides</i>	largemouth bass	WIDE	2-3

**Sample Date:** 1 = collected 1941 to 1960; 2 = collected 1961 to 1980; 3 = collected 1981 to 1997

**Geographic Affinity:** L=Lowland, O=Ozark, P=Prairie, R=Big River, Wide=Widely Distributed,

I=Introduced

Table Bc01. Fish species with a distribution range of the Jacks Fork Watershed (MDC Ozark (3 of 3) Regional Fish Collection Files; Pflieger 1989; Pflieger 1997; MDC 1999c; MoRAP 2000a).

Scientific Name	Common Name	Geographic Affinity	Sample Date
<i>Minytrema melanops</i>	spotted sucker	O,L	2-3
<i>Moxostoma duquesnei</i>	black redhorse	O	1-2-3
<i>Moxostoma erythrurum</i>	golden redhorse	O,P	1-2-3
<i>Moxostoma macrolepidotum</i>	shorthead redhorse	O	2
<i>Nocomis biguttatus</i>	hornyhead chub	O	1-2-3
<i>Notemigonus crysoleucas</i>	golden shiner	WIDE	1
<i>Notropis amblops</i>	bigeye chub	O	1-2-3
<i>Notropis boops</i>	bigeye shiner	O	1-2-3
<i>Notropis greenei</i>	wedgespot shiner	O	1-2-3
<i>Notropis nubilus</i>	Ozark minnow	O	1-2-3
<i>Notropis ozarcanus</i>	Ozark shiner	O	1-2-3
<i>Notropis rubellus</i>	rosyface shiner	O	1-2-3
<i>Notropis telescopus</i>	telescope shiner	O	1-2-3
<i>Noturus albater</i>	Ozark madtom	O	2-3
<i>Noturus exilis</i>	slender madtom	O	2-3

<i>Noturus flavater</i>	<i>checkered madtom</i>	<i>O,L</i>	2-3
<i>Percina evides</i>	<i>gilt darter</i>	<i>O</i>	1-2
<i>Phoxinus erythrogaster</i>	<i>southern redbelly dace</i>	<i>O</i>	2-3
<i>Pimephales notatus</i>	<i>bluntnose minnow</i>	<i>WIDE</i>	1-2-3
<i>Polyodon spathula</i>	<i>paddlefish</i>	<i>R</i>	2
<i>Semotilus atromaculatus</i>	<i>creek chub</i>	<i>O,P</i>	2-3
<i>Stizostedion vitreum</i>	<i>walleye</i>	<i>O,R</i>	2
<i>Typhlichthys subterraneus</i>	<i>southern cavefish</i>	<i>O</i>	3

**Sample Date:** 1 = collected 1941 to 1960; 2 = collected 1961 to 1980; 3 = collected 1981 to 1997

**Geographic Affinity:** L=Lowland, O=Ozark, P=Prairie, R=Big River, Wide=Widely Distributed,

I=Introduced

Table Bc02. Fish species distribution within the drainage units of the Jacks Fork Watershed (1 of 4) (MDC Ozark Regional Fish Collection Files; MDC 1999c; MoRAP 2000). Note: List does not include "species of conservation concern". No collections have been completed in the Lower South Prong, Jam Up Creek, or Leatherwood Units.

Common Name	Scientific Name	NP	USP	PC	JFBH	MJF	JFBC	MC	JFA	JFSC
<i>American eel</i>	<i>Anguilla rostrata</i>								X	X
<i>Arkansas saddled darter</i>	<i>Etheostoma euzonum</i>				X		X		X	
<i>banded darter</i>	<i>Etheostoma zonale</i>	X	X		X		X		X	X
<i>banded sculpin</i>	<i>Cottus carolinae</i>		X		X		X	X	X	X
<i>bigeye chub</i>	<i>Notropis anblaps</i>	X	X					X	X	X
<i>bigeye shiner</i>	<i>Notropis boops</i>				X		X		X	X
<i>bigmouth buffalo</i>	<i>Ictiobus cyprinellus</i>								X	X
<i>black bullhead</i>	<i>Ameiurus melas</i>								X	
<i>black redhorse</i>	<i>Moxostoma duquesnei</i>							X	X	X
<i>blackspotted topminnow</i>	<i>Fundulus olivaceus</i>		X		X		X	X	X	X
<i>bleeding shiner</i>	<i>Luxilus zonatus</i>	X	X	X	X	X	X	X	X	X
<i>bluegill</i>	<i>Lepomis macrochirus</i>	X	X	X	X	X	X	X	X	X
<i>bluntnose minnow</i>	<i>Pimephales notatus</i>				X			X	X	X
<i>brook silverside</i>	<i>Labidesthes sicculus</i>				X					
<i>central stoneroller</i>	<i>Campostoma anomalum</i>	X	X	X	X	X	X	X	X	X
<i>chain pickerel</i>	<i>Esox niger</i>				X		X		X	X
<i>chestnut lamprey</i>	<i>Ichthyomyzon castaneus</i>								X	

<b>common carp</b>	<i>Cyprinus carpio</i>								X	X
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**NP**=North Prong **JFBH**=Jacks Fork-Barn Hollow **MC**=Mahans Creek

**USP**=Upper South Prong **MJF**=Middle Jacks Fork **JFA**=Jacks Fork-Alley

**PC**=Pine Creek **JFBC**=Jacks Fork-Bay Creek **JFSC**=Jacks Fork Shawnee

Creek

Table Bc02. Fish species distribution within the drainage units of the Jacks Fork Watershed (2 of 4) (MDC Ozark Regional Fish Collection Files; MDC 1999c; MoRAP 2000). Note: List does not include "species of conservation concern". No collections have been completed in the Lower South Prong, Jam Up Creek, or Leatherwood Units.

Common Name	Scientific Name	NP	USP	PC	JFBH	MJF	JFBC	MC	JFA	JFSC
<b>creek chub</b>	<i>Semotilus atromaculatus</i>	X		X	X		X	X		X
<b>creek chubsucker</b>	<i>Erimyzon oblongus</i>			X	X		X	X	X	
<b>current darter</b>	<i>Etheostoma uniporum</i>	X	X	X	X		X	X	X	X
<b>fantail darter</b>	<i>Etheostoma flabellare</i>	X	X				X	X	X	
<b>freshwater drum</b>	<i>Aplodinotus grunniens</i>									X
<b>gilt darter</b>	<i>Percina evides</i>								X	X
<b>gizzard shad</b>	<i>Dorosoma cepedianum</i>								X	X
<b>golden redhorse</b>	<i>Moxostoma erythrurum</i>							X	X	X
<b>golden shiner</b>	<i>Notemigonus crysoleucas</i>								X	
<b>goldfish</b>	<i>Carassius auratus</i>									X
<b>green sunfish</b>	<i>Lepomis cyanellus</i>	X	X		X		X	X	X	X

<b>greenside darter</b>	<i>Etheostoma blennioides</i>		X		X	X	X	X	X	X
<b>hornyhead chub</b>	<i>Nocomis biguttatus</i>	X	X	X	X	X	X	X	X	X
<b>largemouth bass</b>	<i>Micropterus salmoides</i>				X			X	X	X
<b>largescale stoneroller</b>	<i>Campostoma oligolepis</i>	X	X		X	X	X	X	X	X
<b>larval lamprey</b>								X		
<b>least brook lamprey</b>	<i>Lampetra aepyptera</i>						X	X	X	
<b>longear sunfish</b>	<i>Lepomis megalotis</i>	X	X	X	X	X	X	X	X	X
<b>longnose gar</b>	<i>Lepisosteus osseus</i>	X			X				X	X

**NP**=North Prong **JFBH**=Jacks Fork-Barn Hollow **MC**=Mahans Creek

**USP**=Upper South Prong **MJF**=Middle Jacks Fork **JFA**=Jacks Fork-Alley

**PC**=Pine Creek **JFBC**=Jacks Fork-Bay Creek **JFSC**=Jacks Fork Shawnee

Creek

Table Bc02. Fish species distribution within the drainage units of the Jacks Fork Watershed (3 of 4) (MDC Ozark Regional Fish Collection Files; MDC 1999c; MoRAP 2000). Note: List does not include "species of conservation concern". No collections have been completed in the Lower South Prong, Jam Up Creek, or Leatherwood Units.

<b>Common Name</b>	<b>Scientific Name</b>	<b>NP</b>	<b>USP</b>	<b>PC</b>	<b>JFBH</b>	<b>MJF</b>	<b>JFBC</b>	<b>MC</b>	<b>JFA</b>	<b>JFSC</b>
<b>northern hog sucker</b>	<i>Hypentelium nigricans</i>	X	X	X	X	X	X	X	X	X
<b>northern studfish</b>	<i>Fundulus catenatus</i>	X	X	X	X	X	X	X	X	X
<b>Ozark chub</b>	<i>Erimystax harrisi</i>	X	X		X	X	X	X	X	

<b><i>Ozark madtom</i></b>	<i>Noturus albater</i>	X	X		X		X	X	X	X
<b><i>Ozark minnow</i></b>	<i>Notropis nubilus</i>	X	X	X	X	X	X	X	X	X
<b><i>Ozark sculpin</i></b>	<i>Cottus hypselurus</i>		X		X		X	X	X	X
<b><i>rainbow darter</i></b>	<i>Etheostoma caeruleum</i>	X	X	X	X	X	X	X	X	X
<b><i>redfin shiner</i></b>	<i>Lythrurus umbratilis</i>				X		X		X	X
<b><i>redspotted sunfish</i></b>	<i>Lepomis miniatus</i>						X	X	X	X
<b><i>rosyface shiner</i></b>	<i>Notropis rubellus</i>		X		X	X	X	X	X	
<b><i>shadow bass</i></b>	<i>Ambloplites ariommus</i>	X			X		X	X	X	X
<b><i>shorthead redhorse</i></b>	<i>Moxostoma macrolepidotum</i>								X	X
<b><i>slender madtom</i></b>	<i>Noturus exilis</i>	X	X	X	X		X	X	X	X
<b><i>southern redbelly dace</i></b>	<i>Phoxinus erythrogaster</i>	X	X	X	X		X	X	X	X
<b><i>smallmouth bass</i></b>	<i>Micropterus dolomieu</i>	X	X	X	X	X	X	X	X	X
<b><i>spotted bass</i></b>	<i>Micropterus punctulatus</i>								X	
<b><i>spotted sucker</i></b>	<i>Minytrema melanops</i>				X	X		X	X	

<i>striped shiner</i>	<i>Luxilus chrysocephalus</i>	X	X	X	X	X	X	X	X	X
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**NP**=North Prong **JFBH**=Jacks Fork-Barn Hollow **MC**=Mahans Creek

**USP**=Upper South Prong **MJF**=Middle Jacks Fork **JFA**=Jacks Fork-Alley

**PC**=Pine Creek **JFBC**=Jacks Fork-Bay Creek **JFSC**=Jacks Fork Shawnee Creek

Table Bc02. Fish species distribution within the drainage units of the Jacks Fork Watershed (4 of 4) (MDC Ozark Regional Fish Collection Files; MDC 1999c; MoRAP 2000). Note: List does not include "species of conservation concern". No collections have been completed in the Lower South Prong, Jam Up Creek, or Leatherwood Units.

Common Name	Scientific Name	NP	USP	PC	JFBH	MJF	JFBC	MC	JFA	JFSC
<i>telescope shiner</i>	<i>Notropis telescopus</i>	X	X	X	X		X	X	X	X
<i>walleye</i>	<i>Stizostedion vitreum</i>					X			X	X
<i>warmouth</i>	<i>Chaenobryttus gulosus</i>								X	X
<i>wedgespot shiner</i>	<i>Notropis greeniei</i>				X	X	X		X	X
<i>white sucker</i>	<i>Catostomus commersoni</i>								X	
<i>whitetail shiner</i>	<i>Cyprinella galactura</i>	X	X		X	X		X	X	X
<i>yellow bullhead</i>	<i>Ameiurus natalis</i>	X					X		X	X

**NP**=North Prong **JFBH**=Jacks Fork-Barn Hollow **MC**=Mahans Creek

**USP**=Upper South Prong **MJF**=Middle Jacks Fork **JFA**=Jacks Fork-Alley

**PC**=Pine Creek **JFBC**=Jacks Fork-Bay Creek **JFSC**=Jacks Fork Shawnee Creek

Table Bc03. Fish Species of the Jacks Fork Watershed not collected in post 1980 samples.

Common Name	# of Sites Where Found Prior to 1981	# of Previous Sites Sampled 1981-1997	Sample Date
American brook lamprey	2	2	1-2
American eel	2	1	2
bigmouth buffalo	2	1	2
black bullhead	1	1	2
chestnut lamprey	1	1	2
common carp	2	2	2
freshwater drum	1	0	2
gilt darter	2	2	1-2
gizzard shad	2	1	2
golden shiner	1	1	1
goldfish	1	1	2
least brook lamprey	3	1	2
paddlefish	1	1	2
shorthead redhorse	2	1	2
spotted bass	1	1	2
walleye	2	1	2
white sucker	1	1	2

**Sample Date:** 1 = collected 1941 to 1960; 2 = collected 1961 to 1980; 3 = collected 1981 to 1997

Table Bc04. Preliminary angler use and catch estimates from the Jacks Fork River Angler Survey MDC (1999b). Note: Survey is currently ongoing. Results from 1990 and 1991 currently unavailable. Standard error (SE<sub>95</sub>) is reported in parenthesis.

Area		Year							
		Pre-Regulation				Post-Regulation			
		92	93	94		95	96	97	98
T r e a t m e n t	Hours	12,794	9,451	7,274		3,395	2,120	2,096	3,278
	Trips	5,269 (±524)	4,566 (±404)	3,349 (±460)		1,210 (±160)	1,203 (±194)	525 (±109)	964 (±136)
	SMB	12,051	10,496	5,814		1,849	1,642	938	2,501
	SB	3,392	2,887	3,607		447	682	483	792
N o n  T r e a t	Hours	2,908	3,333	2,854		1,568	4,267	1,325	1,269
	Trips	2,655 (±314)	3,274 (±370)	2,030 (±264)		644 (±118)	961 (±164)	1,038 (±269)	1,926 (±363)

m e n t	SMB	2,342	977	687		475	1,726	1,220	414
	SB	798	71	365		49	83	145	N/A

SMB-Smallmouth Bass

SB-Shadow Bass

N/A-Not available.

Table Bc05. Mussel distribution within the Jacks Fork Watershed (MoRAP 2000b, MDC 1999e).

<i>Scientific Name</i>	<b>Common Name</b>	<b>L S P</b>	<b>N P</b>	<b>J F B H</b>	<b>M JF</b>	<b>JFBC</b>	<b>JFSC</b>
<i>Alasmidonta marginata</i>	elktoe	Unavailable					
<i>Alasmidonta viridis</i>	slippershell mussel	X	X	X	X	X	
<i>Amblema plicata</i>	threeridge					X	
<i>Corbicula fluminea</i>	Asian clam					X	X
<i>Elliptio dilatata</i>	spike						X
<i>Fusconaia ozarkensis</i>	Ozark pigtoe	X	X	X	X	X	X
<i>Lampsilis reeveiana brevicula</i>	Ozark brokenray			X			
<i>Lampsilis reeveiana reeveiana</i>	Arkansas brokenray	Unavailable					
<i>Lasmigona costata</i>	flutedshell			X			
<i>Leptodea fragilis</i>	fragile papershell					X	
<i>Ligumia subrostrata</i>	pondmussel					X	X
<i>Pleurobema sintoxia</i>	round pigtoe						X
<i>Ptychobranhus occidentalis</i>	Ouachita kidneyshell	Unavailable					
<i>Pyganodon grandis</i>	giant floater					X	X
<i>Strophitus undulatus</i>	creeper			X			X
<i>Toxolasma lividus</i>	Purple Lilliput	Unavailable					
<i>Truncilla donaciformis</i>	fawnsfoot				X		

<i>Utterbackia imbecillis</i>	paper pondshell					X	X
<i>Villosa iris</i>	rainbow	X		X	X	X	X

**LSP**=Lower South Prong **NP**=North Prong **JFBH**=Jacks Fork-Barn Hollow

**MJF**=Middle Jacks Fork **JFBC**=Jacks Fork-Bay Cr. **JFSC**=Jacks Fork Shawnee Cr.

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
Amphipoda	Gammaridae		2
Amphipoda	Gammaridae	<i>Gammarus pseudolimnaeus</i> (Bousfield)	1,2
Amphipoda	Gammaridae	<i>Gammarus</i> sp.	2
Amphipoda	Gammaridae	<i>Gammarus fasciatus</i> (Say)	1,2
Amphipoda	Talitridae	<i>Hyalella azteca</i> (Saussure)	1,2
Coleoptera	Curculionidae	<i>Anchodemus</i> sp.	2
Coleoptera	Curculionidae	<i>Onychylis</i> sp.	1
Coleoptera	Dryopidae	<i>Helichus lithophilus</i> (Germar)	1,2
Coleoptera	Dryopidae	<i>Helichus basalis</i> (LeConte)	2
Coleoptera	Dryopidae	<i>Helichus</i> sp.	2
Coleoptera	Dytiscidae		2
Coleoptera	Dytiscidae	<i>Dytiscus</i> sp.	1
Coleoptera	Dytiscidae	<i>Hydroporus niger</i> (Say)	1
Coleoptera	Elmidae		2
Coleoptera	Elmidae	<i>Ancyronyx variegata</i> (Germar)	1
Coleoptera	Elmidae	<i>Dubiraphia</i> sp.	2
Coleoptera	Elmidae	<i>Dubiraphia vittata</i> (Melsheimer)	2
Coleoptera	Elmidae	<i>Dubiraphia bivittata</i> (LeConte)	1
Coleoptera	Elmidae	<i>Macronychus glabratus</i> (Say)	1,2
Coleoptera	Elmidae	<i>Microcylloepus pusillus pusillus</i> (LeConte)	2
Coleoptera	Elmidae	<i>Optioservus sandersoni</i> (Collier)	1,2
Coleoptera	Elmidae	<i>Stenelmis bicarinata</i> (LeConte)	2

<b>Coleoptera</b>	Elmidae	<i>Stenelmis beameri</i> (Sanderson)	2
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**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
<b>Coleoptera</b>	Elmidae	<i>Stenelmis crenata</i> (Say)	2
<b>Coleoptera</b>	Elmidae	<i>Stenelmis exigua</i> (Sanderson)	2
<b>Coleoptera</b>	Elmidae	<i>Stenelmis lateralis</i> (Sanderson)	2
<b>Coleoptera</b>	Elmidae	<i>Stenelmis cheryl</i> (Brown)	2
<b>Coleoptera</b>	Elmidae	<i>Stenelmis</i> sp.	1,2
<b>Coleoptera</b>	Gyrinidae	<i>Dineutus</i> sp.	2
<b>Coleoptera</b>	Hydrophilidae		1,2
<b>Coleoptera</b>	Hydrophilidae	<i>Enochrus</i> sp.	2
<b>Coleoptera</b>	Hydrophilidae	<i>Tropisternus</i> sp.	2
<b>Coleoptera</b>	Limnidae	<i>Lutrochus laticeps</i> (Casey)	1,2
<b>Coleoptera</b>	Psephenidae	<i>Ectopria nervosa</i> (Melsheimer)	1,2
<b>Coleoptera</b>	Psephenidae	<i>Psephenus herricki</i> (DeKay)	1,2
<b>Decapoda</b>	Cambaridae	<i>Orconectes</i> sp.	1,2
<b>Diptera</b>	Athericidae	<i>Atherix lantha</i> (Webb)	1,2
<b>Diptera</b>	Ceratopogonidae		1
<b>Diptera</b>	Ceratopogonidae	<i>Atrichopogon</i> sp.	1,2
<b>Diptera</b>	Ceratopogonidae	<i>Bezzia/Probezzia</i> ...	1,2
<b>Diptera</b>	Chironomidae		1,2
<b>Diptera</b>	Empididae		1,2

<b>Diptera</b>	Muscidae		1,2
<b>Diptera</b>	Psychodidae		2
<b>Diptera</b>	Simuliidae		1,2
<b>Diptera</b>	Simuliidae	<i>Simulium sp.</i>	2
<b>Diptera</b>	Stratiomyidae		1

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
<b>Diptera</b>	Stratiomyidae	<i>Oxycera sp.</i>	2
<b>Diptera</b>	Tabanidae		1,2
<b>Diptera</b>	Tabanidae	<i>Chrysops sp.</i>	2
<b>Diptera</b>	Tanyderidae	<i>Protoplasa fitchii (Osten-Sacken)</i>	1,2
<b>Diptera</b>	Tipulidae	<i>Antocha sp.</i>	1,2
<b>Diptera</b>	Tipulidae	<i>Hexatoma sp.</i>	1,2
<b>Diptera</b>	Tipulidae	<i>Limonia sp.</i>	2
<b>Diptera</b>	Tipulidae	<i>Tipula sp.</i>	1,2
<b>Diptera</b>	Tipulidae	<i>Tipulidae</i>	1,2
<b>Ephemeroptera</b>	Baetidae	<i>Acentrella sp.</i>	1,2
<b>Ephemeroptera</b>	Baetidae	<i>Baetis sp.</i>	2
<b>Ephemeroptera</b>	Baetidae	<i>Baetis tricaudatus (Dodds)</i>	1,2
<b>Ephemeroptera</b>	Baetiscidae	<i>Baetisca lacustris (McDunnough)</i>	1
<b>Ephemeroptera</b>	Baetiscidae	<i>Baetisca sp.</i>	2
<b>Ephemeroptera</b>	Caenidae	<i>Caenis sp.</i>	1,2

<b>Ephemeroptera</b>	Ephemerellidae	<i>Ephemerella (invaria grp.)</i>	1
<b>Ephemeroptera</b>	Ephemerellidae	<i>Ephemerella subvaria (McDunnough)</i>	2
<b>Ephemeroptera</b>	Ephemerellidae	<i>Ephemerella sp.</i>	2
<b>Ephemeroptera</b>	Ephemerellidae	<i>Eurylophella (bicolor grp.)</i>	1
<b>Ephemeroptera</b>	Ephemerellidae	<i>Eurylophella sp.</i>	2
<b>Ephemeroptera</b>	Ephemerellidae	<i>Eurylophella bicolor (Clemens)</i>	2
<b>Ephemeroptera</b>	Ephemerellidae	<i>Serratella deficiens (Morgan)</i>	2
<b>Ephemeroptera</b>	Ephemerellidae	<i>Serratella (serrata grp.)</i>	2
<b>Ephemeroptera</b>	Ephemerellidae	<i>Serratella sp.</i>	1

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

<b>Order</b>	<b>Family</b>	<b>Species</b>	<b>Period</b>
<b>Ephemeroptera</b>	Ephemeridae	<i>Ephemera sp.</i>	2
<b>Ephemeroptera</b>	Ephemeridae	<i>Ephemera guttulata (Pictet)</i>	1,2
<b>Ephemeroptera</b>	Heptageniidae	<i>Heptagenia sp.</i>	1,2
<b>Ephemeroptera</b>	Heptageniidae	<i>Leucrocuta sp.</i>	2
<b>Ephemeroptera</b>	Heptageniidae	<i>Rhithrogena sp.</i>	2
<b>Ephemeroptera</b>	Heptageniidae	<i>Rhithrogena pellucida (Daggy)</i>	1,2
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenacron sp.</i>	2
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenacron gildersleevei (Traver)</i>	1
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenacron (interpunctatum grp.)</i>	1,2
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenonema vicarium (Walker)</i>	1
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenonema pulchellum (Walsh)</i>	1,2

<b>Ephemeroptera</b>	Heptageniidae	<i>Stenonema terminatum</i> (Walsh)	2
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenonema bednariki</i> (McCafferty)	1,2
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenonema femoratum</i> (Say)	1,2
<b>Ephemeroptera</b>	Heptageniidae	<i>Stenonema mediopunctatum</i> (McDunnough)	1,2
<b>Ephemeroptera</b>	Isonychiidae	<i>Isonychia</i> sp.	1,2
<b>Ephemeroptera</b>	Leptophlebiidae		1,2
<b>Ephemeroptera</b>	Leptophlebiidae	<i>Choroterpes</i> sp.	2
<b>Ephemeroptera</b>	Leptophlebiidae	<i>Paraleptophlebia moerens</i> (McDunnough)	1
<b>Ephemeroptera</b>	Leptophlebiidae	<i>Paraleptophlebia praepedita</i> (Eaton)	1
<b>Ephemeroptera</b>	Potamanthidae	<i>Anthopotamus</i> sp.	1,2
<b>Ephemeroptera</b>	Tricorythidae	<i>Tricorythodes</i> sp.	1,2
<b>Gordiida</b>			1,2
<b>Hemiptera</b>	Corixidae	<i>Sigara mathesoni</i> (Hungerford)	2

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
<b>Hemiptera</b>	Gerridae	<i>Gerris remigis</i> Say	2
<b>Hemiptera</b>	Gerridae	<i>Metrobates hesperius</i> (Uhler)	2
<b>Hemiptera</b>	Gerridae	<i>Rheumatobates</i> sp.	1
<b>Hemiptera</b>	Veliidae		1
<b>Hemiptera</b>	Veliidae	<i>Microvelia americana</i> (Uhler)	2
<b>Hemiptera</b>	Veliidae	<i>Rhagovelia</i> sp.	1,2
<b>Hirudinea<sup>2</sup></b>			1,2

<b>Hirudinea<sup>2</sup></b>	Branchiobdellidae <sup>1</sup>		1,2
<b>Hydracarina</b>	Acari		1,2
<b>Isopoda</b>	Asellidae	<i>Caecidotea sp.</i>	1,2
<b>Lepidoptera</b>	Pyralidae	<i>Petrophila sp.</i>	1,2
<b>Lymnophila</b>	Ancylidae	<i>Ferrissia fragilis (Tryon)</i>	1,2
<b>Lymnophila</b>	Ancylidae	<i>Ferrissia sp.</i>	2
<b>Lymnophila</b>	Lymnaeidae	<i>Lymnaea (Stagnicola) sp.</i>	2
<b>Lymnophila</b>	Physidae		1
<b>Lymnophila</b>	Physidae	<i>Physa (Physella) sp.</i>	2
<b>Lymnophila</b>	Planorbidae		2
<b>Megagastropoda</b>	Pleuroceridae	<i>Elimia potosiensis potosiensis (Lea)</i>	2
<b>Megagastropoda</b>	Pleuroceridae	<i>Elimia potosiensis plebeius (Gould)</i>	1,2
<b>Megagastropoda</b>	Pleuroceridae	<i>Elimia sp.</i>	2
<b>Megaloptera</b>	Corydalidae	<i>Corydalis cornutus (Linnaeus)</i>	1,2
<b>Megaloptera</b>	Corydalidae	<i>Nigronia fasciatus (Walker)</i>	2
<b>Megaloptera</b>	Corydalidae	<i>Nigronia serricornis (Say)</i>	1,2

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
<b>Megaloptera</b>	Sialidae	<i>Sialis sp.</i>	1,2
<b>Nemata<sup>3</sup></b>			1,2
<b>Odonata</b>	Calopterygidae	<i>Calopteryx maculata (Beauvois)</i>	2
<b>Odonata</b>	Calopterygidae	<i>Hetaerina sp.</i>	2

<b>Odonata</b>	Coenagrionidae		1
<b>Odonata</b>	Coenagrionidae	<i>Argia sp.</i>	2
<b>Odonata</b>	Coenagrionidae	<i>Argia moesta (Hagen)</i>	2
<b>Odonata</b>	Coenagrionidae	<i>Argia sedula (Hagen)</i>	2
<b>Odonata</b>	Gomphidae		1,2
<b>Odonata</b>	Gomphidae	<i>Gomphus sp.</i>	2
<b>Odonata</b>	Gomphidae	<i>Stylogomphus albistylus (Hagen)</i>	2
<b>Oligochaeta</b>			1,2
<b>Plecoptera</b>	Capniidae		1
<b>Plecoptera</b>	Capniidae	<i>Allocaenia sp.</i>	1,2
<b>Plecoptera</b>	Capniidae	<i>Paracania sp.</i>	1
<b>Plecoptera</b>	Leuctridae		1,2
<b>Plecoptera</b>	Leuctridae	<i>Leuctra sp.</i>	2
<b>Plecoptera</b>	Leuctridae	<i>Leuctra tenuis (Pictet)</i>	2
<b>Plecoptera</b>	Nemouridae		1,2
<b>Plecoptera</b>	Nemouridae	<i>Nemoura sp.</i>	2
<b>Plecoptera</b>	Perlidae		2
<b>Plecoptera</b>	Perlidae	<i>Acroneuria sp.</i>	1,2
<b>Plecoptera</b>	Perlidae	<i>Agnetina capitata (Pictet)</i>	1
<b>Plecoptera</b>	Perlidae	<i>Neoperla sp.</i>	2

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
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<b>Plecoptera</b>	Perlidae	<i>Neoperla clymene</i> (Newman)	1,2
<b>Plecoptera</b>	Perlidae	<i>Paragnetina media</i> (Walker)	1
<b>Plecoptera</b>	Perlidae	<i>Paragnetina</i> sp.	2
<b>Plecoptera</b>	Perlidae	<i>Perlesta placida</i> (Hagen)	1,2
<b>Plecoptera</b>	Perlidae	<i>Perlinella</i> sp.	2
<b>Plecoptera</b>	Perlidae	<i>Perlinella drymo</i> (Newman)	1
<b>Plecoptera</b>	Perlodidae	<i>Hydroperla crosbyi</i> (Needham & Claassen)	2
<b>Plecoptera</b>	Perlodidae	<i>Hydroperla</i> sp.	1
<b>Plecoptera</b>	Perlodidae	<i>Isoperla marlynia</i> (Needham & Claassen)	1
<b>Plecoptera</b>	Perlodidae	<i>Isoperla bilineata</i> (Say)	1
<b>Plecoptera</b>	Perlodidae	<i>Isoperla signata</i> (Banks)	1
<b>Plecoptera</b>	Pteronarcyidae	<i>Pteronarcys pictetii</i> (Hagen)	1
<b>Plecoptera</b>	Pteronarcyidae	<i>Pteronarcys</i> sp.	2
<b>Plecoptera</b>	Taeniopterygidae	<i>Strophopteryx fasciata</i> (Burmeister)	1
<b>Plecoptera</b>	Taeniopterygidae	<i>Taeniopteryx</i> sp.	2
<b>Plecoptera</b>	Taeniopterygidae	<i>Taeniopteryx metequi</i> (Ricker & Ross)	1
<b>Trichoptera</b>	Brachycentridae	<i>Brachycentrus</i> sp.	2
<b>Trichoptera</b>	Brachycentridae	<i>Brachycentrus americanus</i> (Banks)	1
<b>Trichoptera</b>	Brachycentridae	<i>Micrasema rusticum</i> (Hagen)	2
<b>Trichoptera</b>	Glossosomatidae		2
<b>Trichoptera</b>	Glossosomatidae	<i>Agapetus</i> sp.	1,2
<b>Trichoptera</b>	Glossosomatidae	<i>Glossosoma intermedium</i> (Klapalek)	2
<b>Trichoptera</b>	Glossosomatidae	<i>Glossosoma</i> sp.	2
<b>Trichoptera</b>	Helicopsychidae	<i>Helicopsyche borealis</i> (Hagen)	1,2

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
<b>Trichoptera</b>	Hydroptilidae	<i>Agraylea multipunctata</i> (Curtis)	1,2
<b>Trichoptera</b>	Hydropsychidae	<i>Ceratopsyche</i> ( <i>morosa</i> grp.)	1,2
<b>Trichoptera</b>	Hydropsychidae	<i>Ceratopsyche morosa</i> (Hagen)	2
<b>Trichoptera</b>	Hydropsychidae	<i>Cheumatopsyche</i> sp.	1,2
<b>Trichoptera</b>	Hydropsychidae	<i>Hydropsyche betteni</i> (Ross)	1,2
<b>Trichoptera</b>	Hydropsychidae	<i>Hydropsyche cuanis</i> (Ross)	1
<b>Trichoptera</b>	Hydropsychidae	<i>Hydropsyche simulans/incommoda</i>	2
<b>Trichoptera</b>	Hydropsychidae	<i>Hydropsyche</i> sp.	2
<b>Trichoptera</b>	Hydroptilidae		2
<b>Trichoptera</b>	Hydroptilidae	<i>Hydroptila</i> sp.	2
<b>Trichoptera</b>	Lepidostomatidae		1,2
<b>Trichoptera</b>	Lepidostomatidae	<i>Lepidostoma</i> sp.	2
<b>Trichoptera</b>	Limnephilidae		1,2
<b>Trichoptera</b>	Limnephilidae	<i>Limnephilus</i> sp.	1
<b>Trichoptera</b>	Limnephilidae	<i>Neophylax fuscus</i> (Banks)	1,2
<b>Trichoptera</b>	Limnephilidae	<i>Pycnopsyche</i> sp.	2
<b>Trichoptera</b>	Philopotamidae	<i>Chimarra</i> sp.	2
<b>Trichoptera</b>	Philopotamidae	<i>Chimarra obscura</i> (Walker)	1,2
<b>Trichoptera</b>	Philopotamidae	<i>Chimarra aterrima</i> (Hagen)	1,2
<b>Trichoptera</b>	Polycentropodidae	<i>Cyrnellus</i> sp.	2

<b>Trichoptera</b>	Polycentropodidae	<i>Neureclipsis sp.</i>	2
<b>Trichoptera</b>	Polycentropodidae	<i>Polycentropus sp.</i>	1,2
<b>Trichoptera</b>	Psychomyiidae	<i>Lype diversa (Banks)</i>	2
<b>Trichoptera</b>	Psychomyiidae	<i>Psychomyia flavida (Hagen)</i>	2

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc06. Benthic invertebrate taxa of the Jacks Fork Watershed (MDC 1998d).

Order	Family	Species	Period
<b>Trichoptera</b>	Rhyacophilidae		1
<b>Tricladida</b>	Planariidae		1,2
<b>Tricladida</b>	Planariidae	<i>Dugesia sp.</i>	2
<b>Unionoida</b>	Unionidae	<i>Elliptio sp.</i>	1
<b>Unionoida</b>	Unionidae	<i>Fusconaia ozarkensis (Call)</i>	2
<b>Unionoida</b>	Unionidae	<i>Lampsilis reeviana brittsi (Simpson)</i>	2
<b>Unionoida</b>	Unionidae	<i>Lampsilis reeviana brevicula (Call)</i>	1
<b>Veneroida</b>	Sphaeriidae		1,2
<b>Veneroida</b>	Sphaeriidae	<i>Sphaerium sp.</i>	2

**Period:** 1=1961-1974, 2=1975-1992

<sup>1</sup> Subclass, <sup>2</sup> Class, <sup>3</sup> Phylum

Table Bc07. Species of conservation concern within the Jacks Fork Watershed (MDC Ozark (1 of 3) Regional Fish Collection Files, Pflieger 1996; MDC 1998c; MDC 1999c; MDC 1999d, MoRAP 2000a, MoRAP 2000b).

<i>Scientific Name</i>	<b>Common Name</b>	<b>Srank</b>	<b>Grank</b>	<b>M</b>	<b>F</b>	<b>Year</b>
<b>Mammals</b>						
<i>Myotis grisescens</i>	gray bat	S3	G3	E	E	1994
<i>Ochrotomys nuttalli</i>	golden mouse	S3?	G5			1988
<b>Birds</b>						
<i>Accipiter striatus</i>	sharp-shinned hawk	S2	G5			1986
<i>Aimophila aestivalis</i>	Bachman's sparrow	S1	G3	E	*	1991
<i>Ardea herodias</i>	great blue heron	S5	G5			1995
<b>Amphibians</b>						
<i>Cryptobranchus alleganiensis bishopi</i>	Ozark hellbender	S2	G4T3		*	1992
<i>Hemidactylium scutatum</i>	four-toed salamander	S4	G5			1980
<b>Fish</b>						
<i>Lampetra appendix</i>	American brook lamprey	S2	G4			1962
<i>Notropis ozarcanus</i>	Ozark shiner	S2	G3		*	1997
<i>Noturus flavater</i>	checkered madtom	S3S4	G4			1997
<i>Polydon spathula</i>	paddlefish	S3	G4		*	1966
<i>Typhlichthys subterraneus</i>	southern cavefish	S2S3	G3			1992

Mussels						
<i>Alasmidonta marginata</i>	elktoe	S2?	G4		*	1982
<i>Lampsilis reeveiana</i> <i>reeveiana</i>	Arkansas brokenray	S2?	G3T1T2			1982
<i>Ptychobranhus</i> <i>occidentalis</i>	Ouachita kidneyshell	S2S3	G3G4		*	1982
<i>Toxolasma lividus</i>	purple Illiput	S2	G2		*	1982

Table Bc07. Species of conservation concern within the Jacks Fork Watershed (MDC Ozark (2 of 3) Regional Fish Collection Files, Pflieger 1996; MDC 1998c; MDC 1999c; MDC 1999d, MoRAP 2000a, MoRAP 2000b).

Scientific Name	Common Name	Srank	Grank	M	F	Year
Crayfish						
<i>Cambarus hubrichti</i>	Salem cave crayfish	S3	G2			N/A
Insects						
<i>Hydropsyche piatrix</i>	a net-spinning caddisfly	S4	G?			1988
<i>Stenonema bednariki</i> <i>McCafferty</i>	a heptageniid mayfly	S3	G?			1989
Plants, Ferns, Fern Allies, and Mosses						
<i>Aster furcatus</i>	forked aster	S2	G3		*	1985-
<i>Aster macrophyllus</i>	big-leaved aster	S2	G5			1990

<i>Barbula convoluta</i> <i>var. convoluta</i>	a moss	<b>S?</b>	<b>G5T?</b>			<b>1963</b>
<i>Berberis canadensis</i>	American barberry	<b>S2</b>	<b>G3</b>			<b>1992</b>
<i>Bromus nottowayanus</i>	a brome	<b>S2S3</b>	<b>G3G4</b>			<b>1932</b>
<i>Calamagrostis porteri</i> <i>ssp. insperata</i>	reed bent grass	<b>S3</b>	<b>G4T3</b>		*	<b>1990</b>
<i>Campanula rotundifolia</i>	harebell	<b>S1</b>	<b>G5</b>			<b>1984</b>
<i>Carex alata</i>	broadwing sedge	<b>S2S3</b>	<b>G5</b>			<b>1990</b>
<i>Carex albicans var.</i> <i>australis</i>	bellow beaked sedge	<b>S1</b>	<b>G5T5</b>			<b>1983</b>
<i>Carex comosa</i>	bristly sedge	<b>S2</b>	<b>G5</b>			<b>1987</b>
<i>Carex decomposita</i>	epiphytic sedge	<b>S3</b>	<b>G3</b>			<b>1997</b>
<i>Carex stricta</i>	tussock sedge	<b>S2?</b>	<b>G5</b>			<b>1983</b>
<i>Carex vesicaria var.</i> <i>monile</i>	a sedge	<b>S2?</b>	<b>G5T4</b>			<b>1987</b>
<i>Cypripedium candidum</i>	small white lady-slipper	<b>S1</b>	<b>G4</b>			<b>1993</b>
<i>Cypripedium reginae</i>	showy lady-slipper	<b>S2S3</b>	<b>G4</b>			<b>1987</b>

**Table Bc07. Species of conservation concern within the Jacks Fork Watershed (MDC Ozark (3 of 3) Regional Fish Collection Files, Pflieger 1996; MDC 1998c; MDC 1999c; MDC 1999d, MoRAP 2000a,**

Scientific Name	Common Name	Srank	Grank	M	F	Year
Plants, Ferns, Fern Allies, and Mosses (continued)						
<i>Delphinium exaltatum</i>	tall larkspur	S2	G3		*	1985-
<i>Didymodon revolutus</i>	a moss	S1	G4			1938
<i>Galium boreale</i> <i>ssp. septentrionale</i>	northern bedstraw	S2	G5T?			1987
<i>Geum virginianum</i>	pale avens	S1	G5			1991
<i>Glyceria acutiflora</i>	sharp-scaled manna grass	S3	G5			1936
<i>Gratiola viscidula</i>	hedge hyssop	S1	G4G5			1975
<i>Homaliadelphus sharpii</i>	Sharp's homaliadelphus	S1	G3			1970
<i>Lemna trisulca</i>	star duckweed	S2	G5			1987
<i>Liparis loeselii</i>	Loesel's twayblade	S2	G5			1984
<i>Nowellia curvifolia</i>	a liverwort	S?	G5			1938
<i>Platanthera flava</i>	rein orchid	S2	G4T4Q			1928
<i>Potamogeton pulcher</i>	spotted pondweed	S2S3	G5			1932
<i>Rhytidiadelphus triquetrus</i>	shaggy moss	S?	G5			1970
<i>Rhytidium rugosum</i>	golden glade-moss	S1	G5			1973
<i>Trautvetteria caroliniensis</i>	false bugbane	S2	G5			1985

<i>Waldsteinia fragarioides</i> <i>ssp. fragar</i>	barren strawberry	S2	G5T5			1985
<i>Zigadenus elegans</i>	white camas	S2	G5			1987

**Year**=Last year observed at site

**F**=Federal Status

**M**=Missouri Status

E=Endangered

T=Threatened

\* =Former category-2 candidate (In December of 1996, the USFWS discontinued the practice of maintaining a list of species regarded as "category-2 candidates". MDC continues to distinguish these species for information and planning purposes.

**S**=State Status

E=Endangered

**SRrank**

S1=Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. (typically 5 or fewer occurrences or very few remaining individuals)

S2=Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. (6 to 20 occurrences or few remaining individuals or acres)

S3=Rare and uncommon in the state. (21 to 100 occurrences)

S4=Widespread, abundant, and apparently secure in state, with many occurrences, but the species is of long-term concern. (usually more than 100 occurrences)

S5=Demonstrably widespread, abundant, and secure in the state, and essentially ineradicable under present conditions.

SU=Unrankable: Possibly in peril in the state, but status uncertain; need more information.

SE=Exotic: An exotic established in the state; may be native in nearby regions.

SH=Historical: Element occurred historically in the state (with expectation that it may be rediscovered). Perhaps having not been verified in the past 20 years, and suspected to be still extant.

S?=Unranked: Species is not yet ranked in the state.

Qualifier:

? =Inexact or uncertain: for numeric ranks, denotes inexactness. (The ? qualifies the character immediately preceding it in Srank)

## Grank

G1=Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. (typically 5 or fewer occurrences or very few remaining individuals or acres)

G2=Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction throughout its range. (6 to 20 occurrences or few remaining individuals or acres)

G3=Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range. (21 to 100 occurrences)

G4=Widespread, abundant, and apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery. Thus, the element is of long-term concern. (usually more than 100 occurrences)

G5=Demonstrably Widespread, abundant, and secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Subrank:

T=Taxonomic subdivision: rank applies to subspecies or variety.

Qualifier:

? =Inexact: denotes inexact numeric rank.

Q=Questionable taxonomy: taxonomic status is questionable; numeric rank may change with taxonomy.

**Note:** Data in table subject to revision. This table is not a final authority.